City of Concord
Technical Standards Manual

Article VII
Landscaping

Species Selection, Installation, and Maintenance Specifications

Concord
NORTH CAROLINA
High Performance Living

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Article VI

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1.0 Introduction

The City of Concord requires planting yards in accordance with the City's development ordinances. This Manual provides detailed specifications for plant species selection, installation, and maintenance.

2.0 Plant Materials

2.1. **Size**. The minimum allowable plant size for new installations is provided below. Due to the biological variations between species, the caliper or height necessary for newly installed plant materials may vary. See Figure 1 for a pictorial representation of common tree terms. As a general rule, the caliper or diameter of trees must be measured a vertical distance of 6 inches from the ground for a tree with a 4-inch caliper or less diameter and measured 12 inches from the ground for a tree with a 4-inch caliper or greater diameter. Shrubs must be at least 24 inches high as measured vertically from the ground to the densest portion of the top of the shrub or hedge. See Figure 2.

a. *Shade Trees*. At the time of planting, shade trees must have a minimum caliper of 2 to 2½ inches and a minimum height of 10 to 12 feet.

b. *Ornamental Trees*. Ornamental trees must have a minimum caliper of 1½ to 2 inches for single-stem trees or 1 to 1½ inches for multi-stem trees, and a minimum height of 6 to 8 feet at the time of planting.

c. *Large Shrubs*. Large shrubs, normally planted for screening, must have a minimum height of 3 to 3½ feet at the time of planting. Shrubs planted for screening purposes shall form the required density to block visibility within three (3) years from the date of installation.

d. *Small Shrubs*. Small shrubs must have a minimum spread and/or height of 18 to 24 inches at the time of planting. A mix of deciduous and evergreen shrubs is encouraged in order to obtain a variety of color and texture throughout the year.

e. *Ground Cover (Organic)*. Organic ground covers must provide 100 percent coverage on the ground within three (3) years of installation. Except when newly seeded, grass or turf shall provide 100 percent coverage. Organic mulch may be used around plantings to maintain soil moisture and prevent the growth of weeds.

f. *Ground Cover (Inorganic)*. Inorganic ground covers consisting of river rock or similar materials may be used provided they do not exceed 20 percent coverage of the required landscape planting area.

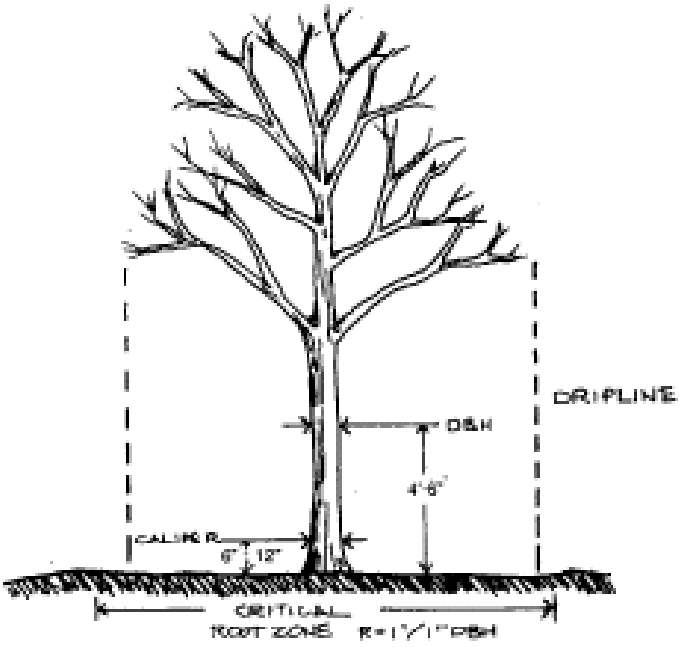

Figure 1: Diagram of Common Tree Terms.

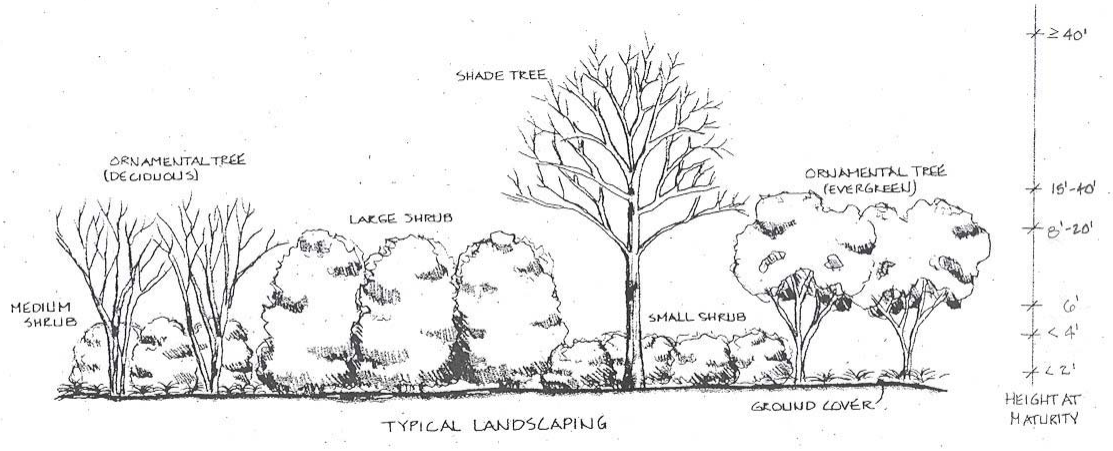

Figure 2: Size of Plant Classifications.

2.2. **Plant Species**.

a. *Acceptable Plant Species*. All plant material, excluding ground covers, should be selected from Table 1. Consideration should be given to the environmental conditions of the site, such as soil, topography, climate, microclimate, pattern of sun movement, prevailing winds and precipitation, and air movement to ensure that plant materials will be established successfully. Plant materials discouraged due to marginal hardiness in this zone, disease susceptibility, or overuse are identified in Table 1. The removal and replacement of invasive exotic plant species are strongly encouraged. Trees near utility rights-of-way must be small to medium in size, pest- and disease-resistant, and slow growing. Table 1 shall be reviewed annually by the Administrator for changes deemed necessary.

b. *Native Plant Species.* 50% of Plants listed in the landscape plan shall consist of native plants identified in the Acceptable Plant Species Table 1.

c. *Invasive Plants.* No plants listed in the current edition of the NC State University or USDA Invasive Plants lists shall be used.

d. *Acceptable Substitutes*. The Administrator has the authority to approve the installation of comparable substitution plant materials not listed on Table 1 to satisfy the requirements of Article 11 when other unforeseen conditions prevent the exact materials shown on the approved landscape plan. Significant changes that require the replacement and relocation of more than 25 percent of the plant materials requires a new landscape plan and approval through the plan review process.

e. *Uniformity and Diversification*. A mixture of plant genus and species, and perennials and annuals is encouraged to avoid potential loss due to infectious disease, blight, or insect infestation. Planting material shall be limited to no greater than 10 percent of any one species or cultivar, 20 percent of any one genus, and 30 percent of any one family of plant. Planting yards should retain a reasonably uniform design along both sides of a street within the same block or corridor.

Table 1: Acceptable Plant Species.

Acceptable Shade Trees **Unsuitable for use under, or within 20' of overhead utility lines** **# Native**	**Botanical Name**	**Common Name**	**Use Discouraged**
	Acer rubrum#	Red maple	X
	Acer saccharum #	Sugar maple	
	Acer x fremanii	Freeman Maple	
	Betula nigra #	River birch	X
	Carya cordiformis #	Bitternut hickory	
	Carya glabra #	Pignut hickory	
	Carya illinoensis #	Pecan	
	Carya ovata	Shagbark hickory	
	Cedrus deodara	Deodar cedar	
	Celtis occidentalis #	Hackberry	
	Cryptomeria japonica	Japanese Cryptomeria	
	Cupressocyparis leylandii	Leyland cypress	
	Diospyros virginiana #	Persimmon	X
	Fraxinus americana #	White ash	X
	Fraxinus pennsylvanica	Green ash	X
	Ginkgo biloba	Ginkgo	
	Gymnocladus dioicus 'Stately Manor'	Kentucky Coffee Tree	
	Juniperus virginiana #	Eastern red cedar	
	Liquidambar styaciflua 'Rotundiloba' #	Fruitless sweetgum	
	Liriodendron tulipifera #	Tulip poplar	
	Magnolia grandiflora #	Southern magnolia	
	Metasequoia glyptostroboides	Dawn Redwood	
	Nyssa sylvatica #	Black gum	
	Pinus echinata #	Short leaf pine	
	Pinus nigra	Austrian pine	
	Pinus taeda #	Loblolly pine	
	Pinus thunbergi	Japanese black pine	
	Pinus virginiana #	Virginia pine	
	Plantanus occidentalis #	Sycamore	
	Quercus acutissima	Sawtooth oak	
	Quercus alba #	White oak	
	Quercus bicolor #	Swamp white oak	
	Quercus coccinea #	Scarlet oak	
	Quercus falcata #	Southern red oak	
	Quercus laurifolia #	Laurel oak	
	Quercus nigra #	Water oak	
	Quercus palustris #	Pin oak	
	Quercus phellos #	Willow oak	X
	Quercus shumardii #	Shumard oak	
	Quercus stellata #	Post oak	
	Quercus velutina #	Black oak	
	Quercus virginiana #	Live oak	
	Sophora japonica regent	Japanese pagoda tree	
	Taxodium distichum #	Bald cypress	
	Tilia codata	Little leaf linden	
	Ulmus alata #	Winged elm	
	Ulmus Americana "New Harmony" #	New harmony elm	
	Ulmus parvifolia	Lacebark elm	X
	Zelkova serrata	Japanese zelkova	

Acceptable	Botanical Name	Common Name	Use Discouraged
Ornamental Trees	*Acer buergeranum*	Trident maple	
	Acer campestre	Hedge maple	
	Acer palmatum	Japanese maple	
	Amelanchier canadensis #	Serviceberry	
	Carpinus betulus	European hornbeam	
	Carpinus caroliniana #	American hornbeam	
	Cercis spp #	Redbud Cultivars	
	Cornus florida #	Flowering dogwood	
	Cornus kousa	Kousa dogwood	
	Crataegus phaenopyrum #	Washington hawthorn	
	Halesia carolina #	Carolina silverbell	
	Hammamelis mollis	Chinese witch-hazel	
	Ilex fosteri #	Foster holly	
	Ilex opaca #	American holly	
	Ilex opaca hume	Hume holly	
	Ilex x attenuata savannah #	Savannah holly	
	Koelreutaria paniculata	Golden rain-tree	
	Lagerstroemia indica	Crape myrtle	X
	Magnolia soulangeana #	Saucer magnolia	
	Magnolia stellata #	Star magnolia	
	Malus hybrids	Flowering crabapple	
	Ostrya virginiana	Ironwood	
	Oxydendrum arboreum #	Sourwood	
	Pistacia chinensis	Chinese pistache	
	Prunus caroliniana #	Carolina cherry laurel	
	Prunus cerasifera pissardii	Purpleleaf plum	
	Prunus serrulata kwanzan	Kwanzan cherry	
	Prunus subhirtella pendula	Weeping cherry	
	Prunus yedoensis	Yoshino cherry	
	Ulmus carpinifolia x parviefolia	Frontier elm	
	Abelia grandiflora	Glossy avelia	
	Aucuba japonica	Japanese aucuba	
	Azealea hybrid	Glenn dale azalea	
	Azalea indica	Indian azalea	
	Azalea obtusum kaempferi	Kaempferi azalea	
	Berberis julianae	Wintergreen barberry	
	Berberis thunbergii	Japanese barberry	
	Callicarpa Americana #	American beautyberry	
	Calycanthus floridus #	Sweetshrub	
	Camellia japonica	Camellia	
	Camellia sasanqua #	Sasanqua camellia	
	Ceanothus americanus #	New Jersey Tea	
	Cephalanthus occidentalis #	Buttonbush	
	Chaenomeles speciosa	Flowering quince	
	Clethraa alinifola #	Sweet Pepperbush	
	Cleyera japonica	Cleyera	
	Corylus Americana #	Hazelnut	
	Euonymus alatus	Winged euonymus	
	Euonymus Americanus #	Strawberry bush	
	Euonymus japonicus	Evergreen euonymus	

Acceptable	**Botanical Name**	**Common Name**	**Use Discouraged**
	Forsythia intermedia	Forsythia	
	Gaylussacia dumos #	Dwarf huckleberry	
	Gaylussacia frondosa #	Blue Huckleberry	
	Hammamelis virginiana	Witch-hazel	
	Hydrangea quercifolia	Oakleaf hydrangea	
	Ilex aquifolium	English holly	
	Ilex cornuta	Chinese holly	
	Ilex cornuta burfordi	Burford holly	
	Ilex crenata 'hetzi'	Hetzi japanese holly	
	Ilex crenata 'rotundifolis'	Roundleaf japanese holly	
	Ilex "Emily Brunner"	Emily brunner holly	
	Ilex glabra #	Inkberry holly	
	Ilex latifolia	Lusterleaf holly	
	Ilex pernyi	Perny holly	
	Ilex vomitoria #	Yaupon holly	X
	Itea virginica #	Virginia willow	
	Juniperus chinensis pfitzeriana	Pfitzer juniper	
	Juniperus chinesis hetzi	Hetzi juniper	
	Kalmia latifolia #	Mountain latifolia	
	Laurus nobilis	Laurel	
	Leucothoe axillaris #	Coastal doghobble	
	Leucothoe fontanesiana #	Mountain doghobble	
	Leucothoe racemose #	Swamp doghobble	
	Ligustrum vicaryi	Vicary golden privet	
	Lindera benzonin #	Vicary golden privet	
	Loropetalum chinense	Lotopetalum	
	Lyonia Lucida #	Fetterbrush	
	Mahonia bealei	Leatherleaf mahonia	
	Myrica cerifera	Wax myrtle	
	Myrica heterophylla #	Bayberry	
	Osmanthus fortunei	Fortune tea olive	
	Osmanthus fragrans	Fragrant tea olive	
	Osmanthus heterophyllus	Holly osmanthus	
	Osmanthus heterophyllus rotundifolius	Curly leaf tea olive	
	Pieris floribunda #	Mountain andromeda	
	Pieris japonica	Japanese andromeda	
	Prunus laurocerasus	English laurel	
	Prunus laurocerasus "Zabel"	"Zabel" Skip laurel	
	Prunus laurocerasus angustifolia	Narrow leafed english laurel	
	Pyracantha coccinea	Scarlet firethorn	
	Raphiolepsis umbellata	Yeddo-hawthorn	
	Raphiolepsis indica	India hawthorn	
	Rhododendron atlanticum #	Dwarf azalea	
	Rhododendron catawbiense #	Catawba rhododendron	
	Rhododendron periclimenoides #	Wild azalea	
	Rosa carolina #	Carolina rose	
	Rosa palustris #	Swamp rose	
	Sambucus canadensis #	American elderberry	
	Sorbus arbutifolia #	Red chokeberry	
	Spirea cantoniensis	Reves spirea	

Acceptable	Botanical Name	Common Name	Use Discouraged
	Spirea thunbergi	Thunberg spirea	
	Spirea prunifolia plena	Bridalwreath spirea	
	Spirea vanhouttei	Vanhoutte spirea	
	Taxus cuspidata	Japanese yew	
	Vaccinium corymbosum #	Highbush blueberry	
	Vaccinium stamineum #	Deerberry	
	Vaccinium vacillans #	Lowbush blueberry	
	Viburnum acerifolia #	Mapleleaf viburnum	
	Viburnum dentatum #	Arrowood	
	Viburnum nudum #	Wild raisin	
	Viburnum rhytidophyllum	Leatherleaf viburnum	
	Viburnum tinus	Laurestinus viburnum	

[1] These species must be used for plantings within perennial and intermittent stream buffers.

[2] These species are discouraged due to marginal hardiness in this zone, disease susceptibility, or overuse.

3.0 Installation Specifications.

3.1. **Soil Preparation**. The preparation of plant pits, hedge trenches, and shrub beds must conform to Leaflet No: 601, Planting Techniques for Trees and Shrubs, North Carolina Cooperative Extension Service, (1997), which is incorporated by reference. Rock, debris, inorganic compositions, and chemical residues must be removed from the soil in planting pits.

3.2. **Excavation**. For planting pits, beds or trenches that are developed in areas that were previously paved, all paving and base stone shall be removed as part of the excavation. Pits must be excavated with vertical sides at a depth approximately equal to the depth of the root ball with a circular outline approximately 2 to 3 times wider than the root ball.

3.3. **Planting**. Root balls should be installed on a flat, compact surface of undisturbed soil and any inorganic ties on top of the root ball must be removed. The top 1/3 of wire baskets should be removed. The top of the tree root ball must not be covered by soil and must be covered by mulch. At least 3 inches of mulch, pine needles, tree bark, or similar materials must be distributed around the plant. See Figures 3 and 4. Tree and shrub supports should not interfere with the plants' typical growing patterns.

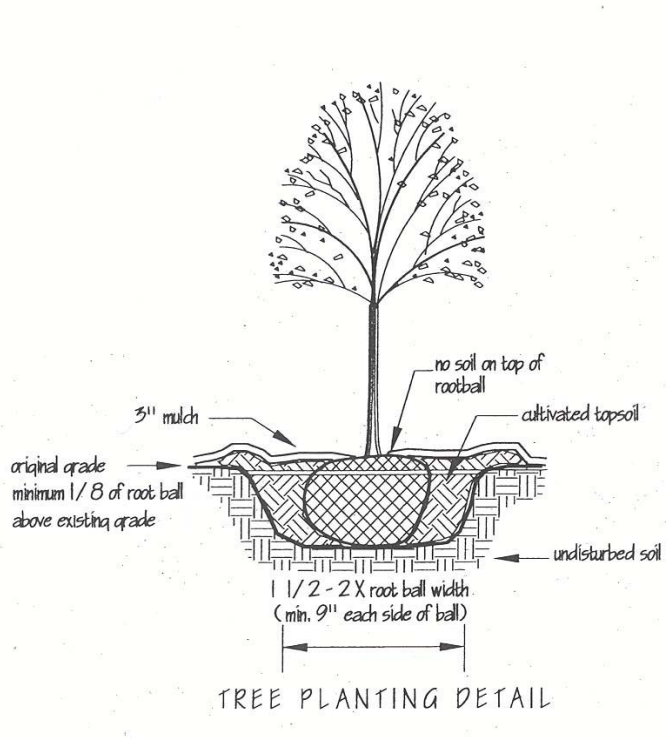

Figure 3: Tree Planting Detail.

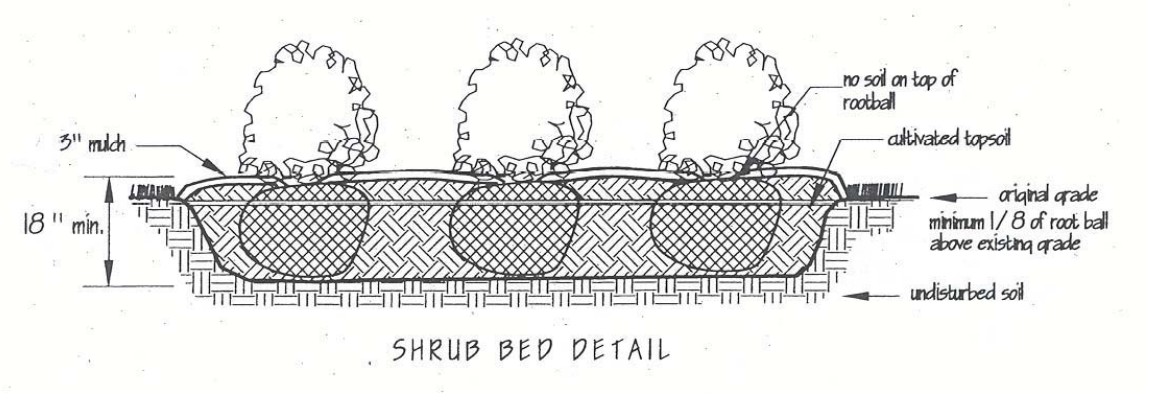

Figure 4: Shrub Planting Detail.

3.4. **Standard of Care during Construction**. Equipment, wood, and similar objects should not be stored or laid upon the critical root zone (see Figure 1) during or after construction. Chemicals and liquid construction wastes must not be dumped, poured, or spilled in the area of any plant materials. Concrete mixer washing should not be performed near the planting site.

3.5. **Associated References**. Soil preparation, planting, fertilization, mulching, and insect and disease control must conform to the North Carolina Cooperative Extension Service, Landscape Management Calendar, which is incorporated by reference hereto. Native plants salvaged from the site or relocated as a result of grading must be re-established in conformance with the recommendations of the North Carolina Cooperative Extension Service.

4.0 Maintenance

4.1. **Responsible Party**. The applicant, property owner, and/or subsequent or successor owner, and their agents, including tenants, are jointly and severally responsible for maintenance of landscaping on the property on a continuing basis for the life of the development as specified in this section.

4.2. **Standard of Care**. All required landscaping must be maintained in a neat and orderly manner at all times. This includes, but is not be limited to, mowing, edging, pruning, fertilizing, watering, weeding, and other activities common to the maintenance of landscaping. Landscaped areas must be kept free of trash, litter, weeds, and other materials or plants not a part of the landscaping. Required landscaping shall be maintained in perpetuity. After the initial installation, the owner and/or tenant of the property upon which the landscaping is installed are responsible for maintaining all required plantings in a healthy, vigorous, and attractive state; and replace dead, diseased, or deteriorated plants. Within residential subdivisions, the maintenance of street trees in planting strips between curbs and sidewalks, which are within the street right-of-way, is the responsibility of the respective homeowners association, or the abutting homeowner, in the absence of a homeowners association. All required plant material must be maintained in a healthy growing condition as is appropriate for the season. Plant materials that exhibit evidence of insect pests, disease, and/or damage must be appropriately treated.

4.3. **Screening**. If after three (3) years following the installation of required screening plant materials, the plants have not formed an effective screen, or if an effective screen is not maintained, the Administrator may require that another type of screen be added or additional plants be installed.

4.4. **Protection from Vehicles**. Landscaped areas must be protected from vehicular encroachment. The Administrator must inspect all landscaping and no Certificate of Occupancy or similar authorization will be issued unless the landscaping meets the requirements of the development ordinances and these technical standards.

4.5. **Replacement of Dead Plants**. Dead plants must be promptly removed and replaced within the next planting season. If replacement is necessary, all plants and other non-living landscape materials shall be equal in size, density, and appearance as originally required at the time of the approval of the development.

4.6. **Pruning**. Utility crews and companies are encouraged to use the directional pruning technique to remove branches interfering with utility lines. This technique prevents damage, disfigurement, and heavy suckering and reduces future pruning needs. Utility tree trimmers should remove branches to laterals (drop-crotching) in order to direct tree growth away from utility lines. Directional pruning includes top trimming, side trimming, under trimming, and through trimming. See Figure 5 for a pictorial representation of directional trimming.

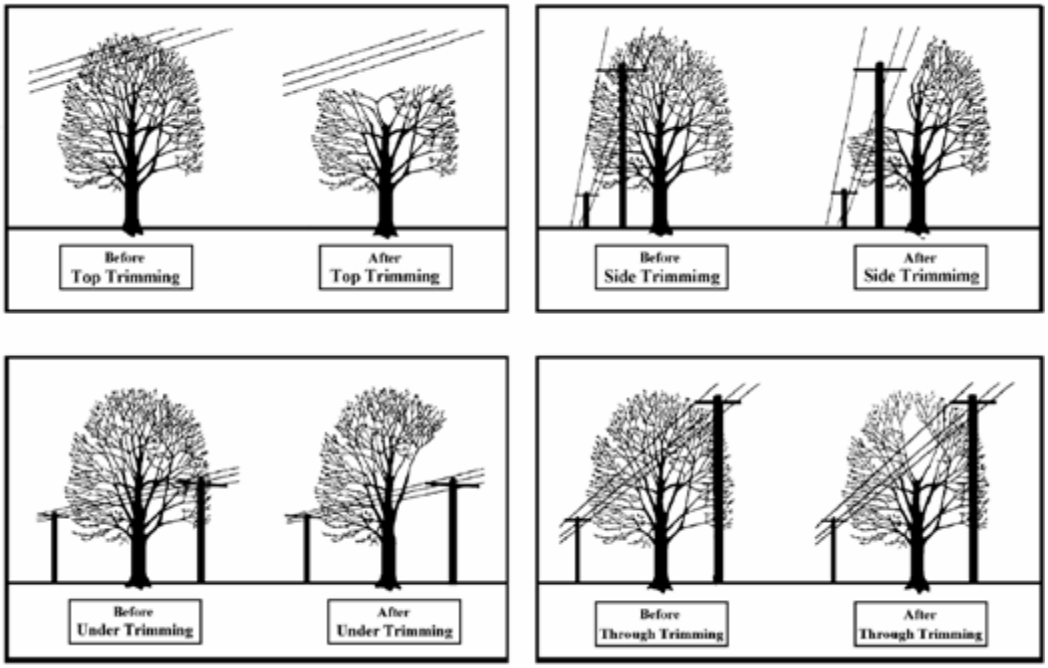

Figure 5: Directional Pruning Examples.